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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Mark Henry SHIPTON et al.

Group Art Unit: 1775

Application No.: 10/676,042

Examiner: A. AUSTIN

Filed: October 2, 2003

Docket No.: 117313

For: METHOD OF FORMING A DIFFUSION BARRIER ON A METALLIC SUBSTRATE

REQUEST FOR RECONSIDERATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In reply to the February 9, 2007 Office Action, reconsideration of the application in light of the following remarks is respectfully requested.

Claims 1-7 and 15-18 are pending in this application. The Office Action, on page 2, rejects claims 1-7 and 15-18 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,676,992 to Pfaendtner et al. (hereinafter "Pfaendtner") in view of International Patent Application No. WO 94/18359 (hereinafter "WO '359"). The Office Action, on page 5, rejects claims 1-7 and 15-18 under 35 U.S.C. §103(a) as being unpatentable over WO '359 in view of Pfaendtner. These rejections are respectfully traversed.

Independent claim 1 recites a method of forming a platinum aluminide diffusion barrier on a titanium alloy substrate, comprising the steps of a) applying to the metallic substrate a coating comprising particulate platinum and particulate aluminum in an organic carrier and b) performing a reaction treatment on the thus applied platinum and aluminum which comprises subjecting the platinum particles and the aluminum particles to a temperature in the range of about 200°C to about 600°C for a time sufficient for the reaction between the platinum and the aluminum to form a diffusion barrier on the substrate.

The Office Action, on pages 2 and 3, asserts that Pfaendtner teaches all of the features recited in claim 1 except for the substrate being a titanium alloy. To cure this deficiency, the Office Action asserts that WO '359 teaches forming diffusion barriers on metallic substrates such as turbine engines in which the substrate may be a titanium alloy. The Office Action summarily concludes that it would have been obvious to one of ordinary skill in the art to form the diffusion barrier layer of Pfaendtner on a titanium alloy substrate as allegedly taught by WO '359. This assertion is incorrect for the following reasons.

First, neither Pfaendtner nor WO '359 teach, nor would they have suggested, the feature of subjecting the platinum particles in the aluminum particles to a temperature in the range of about 200°C to about 600°C as positively recited in claim 1. With respect to this feature, the Office Action explicitly concedes that Pfaendtner merely teaches a reaction treatment that forms aluminide by subjecting the particles to a temperature of from about 1200°F (600°C) to about 2100°F. While this range clearly falls outside of the range recited in claim 1, the Office Action reasons that the temperature of about 649°C substantially approximates the upper limit of the range recited in claim 1 such that one of ordinary skill in the art would have expected no patentable distinction between the two ranges. Significantly, the Office Action proffers no objective evidence in support of its assertion of what is of no patentable distinction in the art.

As is well settled, rejections on obviousness grounds cannot be sustained by mere conclusory statements. Further, what the Office Action asserts to be known by one of ordinary skill in the art is, in fact, the opposite of what is well settled to be well known in the art. Specifically, it is well known that titanium is a relatively reactive metal and easily forms a passivating titanium dioxide film on its surface in the presence of air. The oxide film is porous to oxygen above approximately 400°C such that even at these relatively modest temperatures, the passivating effect of the oxide film is lost. Further, it is well known that

elevated temperatures increase the risk of oxidation damage of titanium alloys. As such, 649°C, as disclosed by Pfaendtner, and 600°C, as recited in claim 1, are clearly not substantially similar temperatures, at least in consideration of what is known in the art. Moreover, the 49°C difference between Pfaendtner and the feature recited in claim 1 represents more than an 8% deviation from 600°C. It is simply unreasonable to assert, in any sophisticated scientific field that relies on precision such as at issue here, that a greater than 8% deviation could reasonably be considered "substantially close."

Second, the Office Action, on page 3 and 7, asserts in a conclusory manner that one would have been motivated to combine Pfaendtner and WO '359 in a manner suggested based on some broad disclosure in WO '359. As discussed above, rejections on obviousness grounds cannot be sustained by mere conclusory statements. Further, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. Some specific motivation in the prior art must be shown without reference to Applicants' disclosure. The Office Action's conclusory assertion is not sufficient to meet this standard. As such, the Office Action clearly fails to support a *prima facie* case of obviousness.

Third, even if Pfaendtner and WO '359 were combinable in the manner suggested by the Office Action, one of ordinary skill in the art would not have had a reasonable expectation of success in combining the references. In particular, as discussed above, Pfaendtner teaches a reaction treatment temperature range of 649°C to about 1149°C. As such, one of ordinary skill in the art would not have had a reasonable expectation of success in combining Pfaendtner with WO '359 at least because the combination of the applied references would not have provided the skilled artisan with the requisite features as recited in claim 1. Moreover, one of ordinary skill in the art would not even have considered the combination of all features recited in claim 1 with a reasonable expectation of success based on the

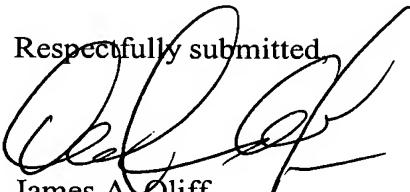
combination of the teachings in the applied references. Several considerations, well known in the art, clearly indicate that at least the combination of all of the features recited in claim 1 would not have been obvious to one of ordinary skill in the art. For example, the high inherent reactivity of an underlying substrate, the presence of an oxide film, the uncontrollability of the oxide film due to the ease of its automatic formation and the variability in the diffusion properties of the oxide film even at modest temperature present substantial difficulties in devising an effective diffusion barrier layer and method of reducing such layer, especially with respect to titanium alloys, all indicate that the claimed process is the product of careful consideration of several dependently variable factors. Thus, the combination of all of the features recited in claim 1 could not reasonably be expected to have been arrived at by one of ordinary skill in the art based on the disclosures of the applied references. As such, based on the evidence of record provided in the Office Action, it is unreasonable to assert that the applied references even imply some degree of predictability such that the combination of all of the features recited in claim 1 would have been obvious in view of Pfaendtner and WO '359.

For at least the foregoing reasons, the applied references cannot reasonably be considered to have suggested the combination of all of the features positively recited in independent claim 1. Additionally, claims 2-7 and 15-18 also would not have been suggested by the combinations of applied references for at least the respective dependence of these claims directly or indirectly on claim 1, as well as for the separately patentable subject matter that each of these claims recites.

Accordingly, reconsideration and withdrawal of the rejections of claims 1-7 and 15-18 under 35 U.S.C. §103(a) as being unpatentable over the combinations of the applied references are respectfully requested.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-7 and 15-18 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted

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JAO:CJW/tbm

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